



0.6A MOSFET/IGBT Gate Driver Optocoupler

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Features

- Peak Output Current : $I_{OP} = \pm 0.6A$ (max)
- Threshold Input Current: $I_{FLH} = 5\text{ mA}$ (max)
- Common mode transient immunity : $\pm 25kV/\mu s$ (min)
- RoHS and REACH Compliance
- MSL class 1
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5(VDE0884-5)
 - ✓ CQC – GB4943.1, GB8898(14001104999)
 - ✓ IEC62368 (FI/41119)

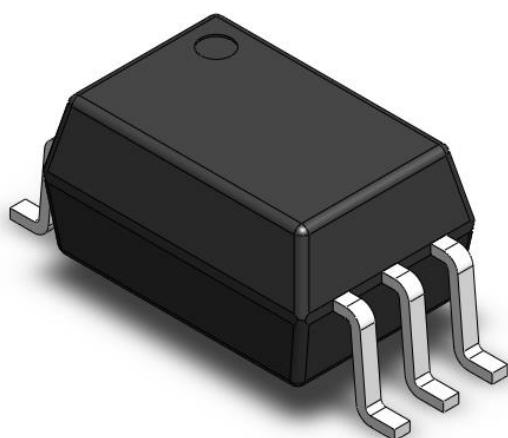
Description

The CTS701 consists of a GaAsP LED optically coupled to an integrated circuit with a power output stage. This optocoupler is ideally suited for driving power IGBTs and MOSFETs used in motor control inverter applications. The high operating voltage range of the output stage provides the drive voltages required by gate controlled devices.

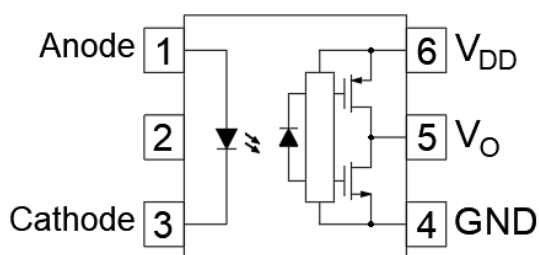
Applications

- Isolated IGBT/Power MOSFET gate drive
- Industrial Inverter
- AC brushless and DC motor drives
- Induction Heating

Package Outline



Schematic



Truth Table

LED	$V_{CC}-V_{EE}$	$V_{CC}-V_{EE}$	Output
	Positive Going	Negative Going	
Off	0 to 30 V	0 to 30V	Low
On	0 to 11.0V	0 to 9.5V	Low
On	11.0 to 13.5V	9.5 to 12V	Transition
On	13.5 to 30V	12 to 30V	High

Note: Different lead forming options available. See package dimension.



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www.ct-micro.com**Absolute Maximum Ratings** $T_A = 25^{\circ}\text{C}$, unless otherwise specified

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters	Ratings	Units	Notes
V_{ISO}	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)	5000	V_{RMS}	
T_{OPR}	Operating temperature	-40 ~ +100	$^{\circ}\text{C}$	
T_{STG}	Storage temperature	-55 ~ +125	$^{\circ}\text{C}$	
T_{SOL}	Soldering temperature (For 10 seconds)	260	$^{\circ}\text{C}$	
P_{T}	Total Power Dissipation	300	mW	
Emitter				
I_{F}	Forward current	25	mA	
I_{FP}	Peak forward current (50% duty, 1ms P.W)	1	A	
V_{R}	Reverse voltage	5	V	
Detector				
P_{O}	Output Power dissipation	250	mW	
$V_{\text{O(PEAK)}}$	Peak Output Voltage	35	V	1
I_{OPH}	Output High Peak Current	0.6	A	2
I_{OPL}	Output Low Peak Current	0.6	A	2
V_{CC}	Supply voltage	35	V	

Notes

1. The $V_{\text{O(PEAK)}}$ voltage CAN NOT BE high than V_{CC} .
2. The I_{O} maximum pulse width = 10 us, maximum duty cycle = 0.2%.



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Electrical Characteristics

Over recommended operating conditions $T_A = -40$ to $100\text{ }^{\circ}\text{C}$. Typical values are measured at $V_{CC}=30\text{V}$, $V_{EE}=GND$, $T_A = 25^{\circ}\text{C}$ (unless otherwise stated)

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward Voltage	$I_F = 10\text{mA}$	-	1.4	1.8	V	
V_R	Reverse Voltage	$I_R = 10\mu\text{A}$	5.0	-	-	V	
$\Delta V_F / \Delta T_A$	Temperature coefficient of forward voltage	$I_F = 10\text{mA}$	-	-1.7	-	mV/ $^{\circ}\text{C}$	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
I_{CCL}	Logic Low Supply Current	$I_F = 0\text{mA}$	-	1.5	3	mA	
I_{CCH}	Logic High Supply Current	$I_F = 10\text{mA}$	-	1.5	3		

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_{OH}	High Level Output Voltage	$I_F = 10\text{mA}$, $I_O = -100\text{mA}$	$V_{CC} - 0.6$	$V_{CC} - 0.4$	-	V	
V_{OL}	Low Level Output Voltage	$I_F = 0\text{mA}$, $I_O = 100\text{mA}$	-	0.25	0.4	V	
I_{OPH}	High Level Output Current	$V_O = V_{CC} - 2\text{V}$	-	-	-0.3	A	1
		$V_O = V_{CC} - 4\text{V}$	-	-	-0.6		1
I_{OPL}	Low Level Output Current	$V_O = V_{EE} + 2\text{V}$	0.3	-	-	A	1
		$V_O = V_{EE} + 4\text{V}$	0.6	-	-		1
I_{FLH}	Input Threshold Current	$I_O = 0\text{mA}$, $V_O > 5\text{V}$	-	1.4	5.0	mA	
V_{FHL}	Input Threshold Voltage	$I_O = 0\text{mA}$, $V_O < 5\text{V}$	0.8	-	-	V	
V_{UVLO+}	Under Voltage Lockout	$I_O = 10\text{mA}$, $V_O > 5\text{V}$	6.9	7.8	8.7	V	
V_{UVLO-}	Threshold	$I_O = 10\text{mA}$, $V_O < 5\text{V}$	5.9	6.7	7.5	V	
$UVLO_{HYS}$	Under Voltage Lockout Hysteresis		-	1.1	-	V	

Notes

1. The I_O maximum pulse width = 10 μs , maximum duty cycle = 0.2%.



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Switching Characteristics

Symbol	Parameters	Test Conditions		Min	Typ	Max	Units	Notes
T_{PHL}	High to Low Propagation Delay	$R_g = 47\Omega$, $C_g = 3$ nF, $f = 10$ kHz, Duty = 50%, $I_F = 10$ mA, $V_{CC} = 30V$		100	160	300	ns	
T_{PLH}	Low to High Propagation Delay			100	130	300	ns	
PWD	Pulse Width Distortion			-	30	-	ns	
PDD	Propagation Delay Difference Between Any Two Parts or Channels			-100	-	100	ns	
t_r	Rise Time			-	20	100	ns	
t_f	Fall Time			-	20	100	ns	
$ CM_H $	Common Mode Transient High	$V_{CC} = 30V$, $T_A = 25^\circ C$,	$I_F = 7.5$ mA	25	-	-	kV/ μs	
$ CM_L $	Common Mode Transient Low	$V_{CM} = 1.5$ kV	$I_F = 0$ mA	25	-	-	kV/ μs	



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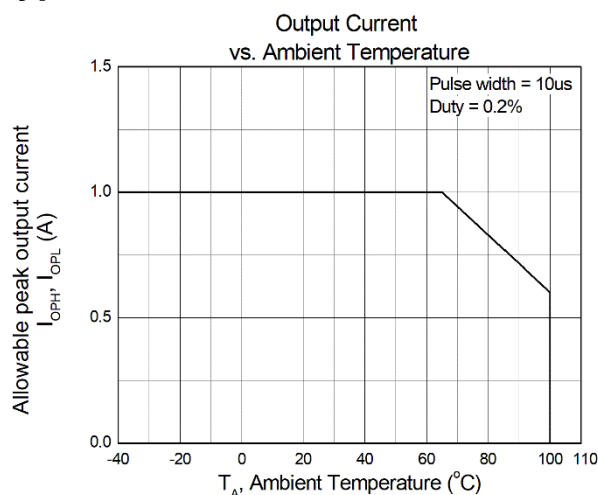
www.ct-micro.comTypical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

Figure 1

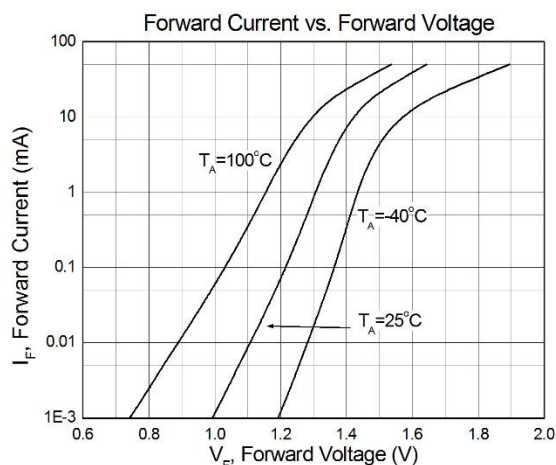


Figure 2

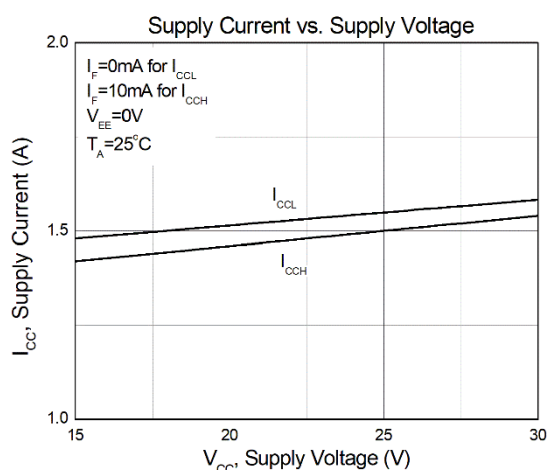


Figure 3

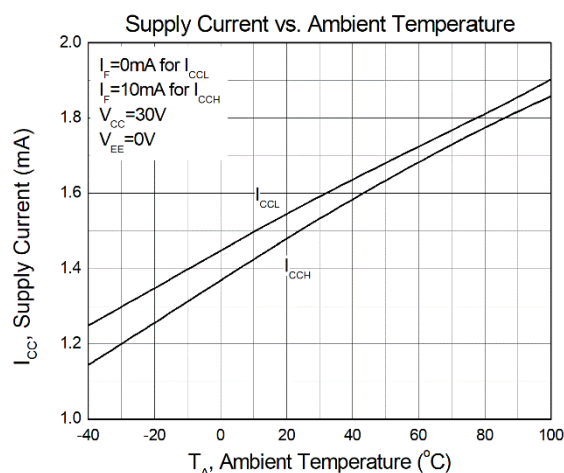


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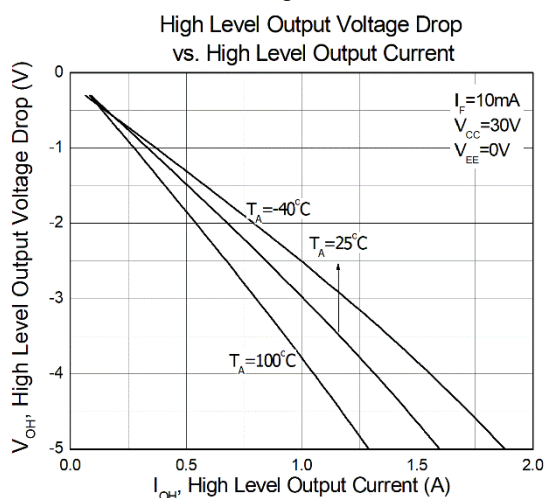


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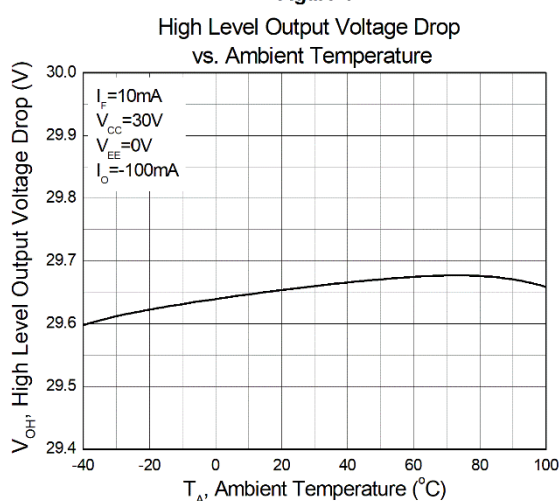


Figure 6



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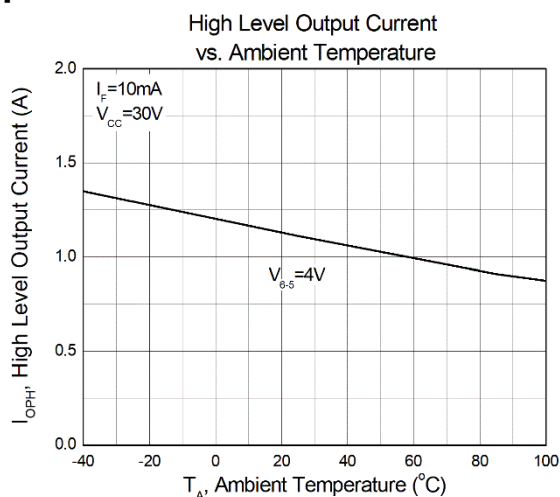
www.ct-micro.comTypical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

Figure 7

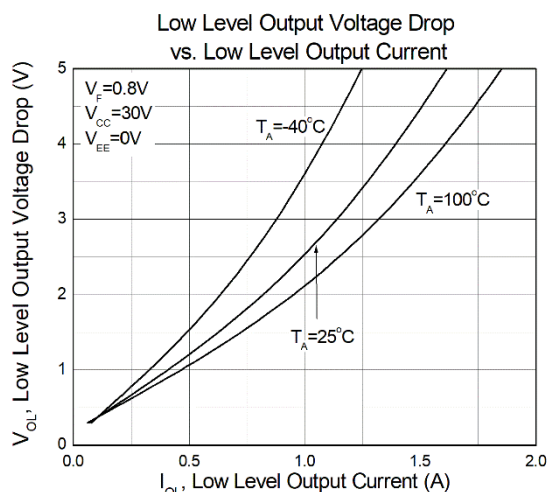


Figure 8

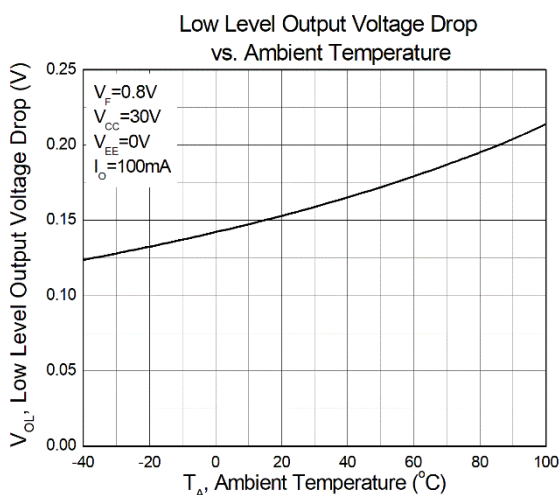


Figure 9

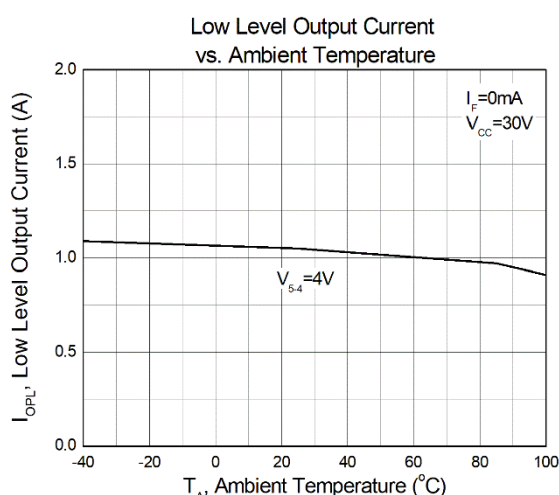


Figure 10

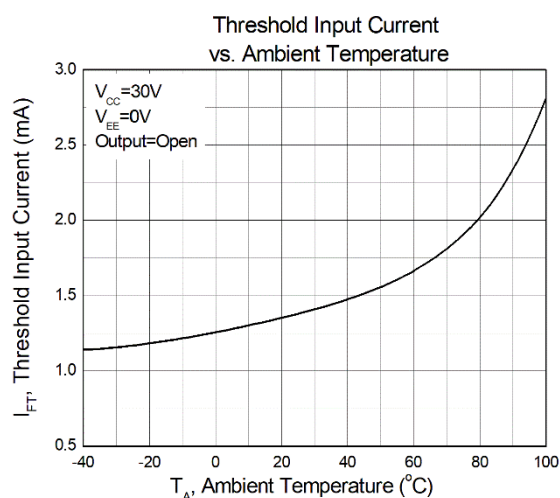


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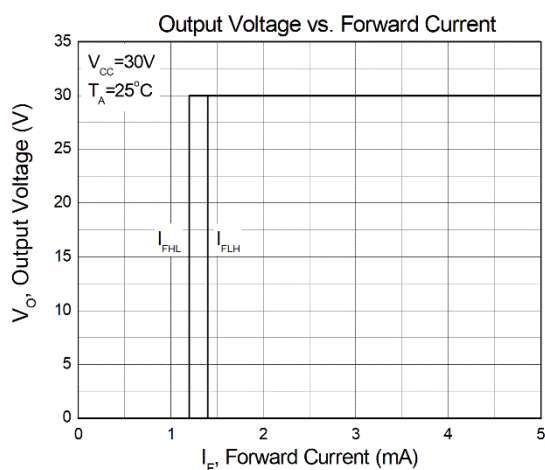


Figure 12



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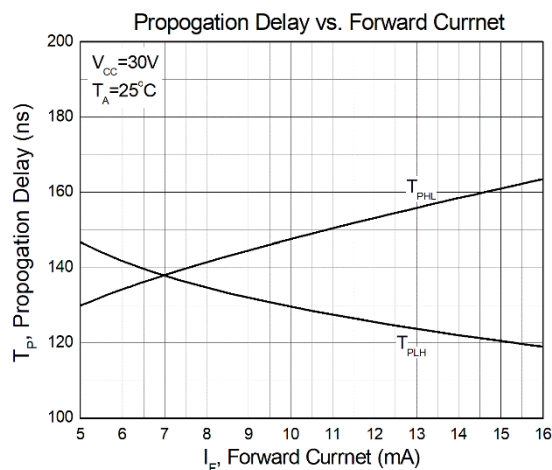
www.ct-micro.comTypical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

Figure 13

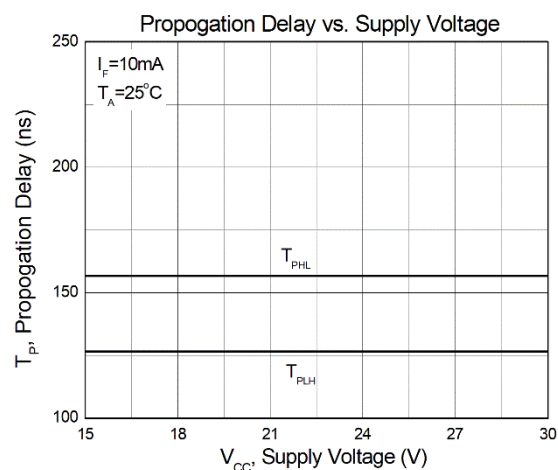


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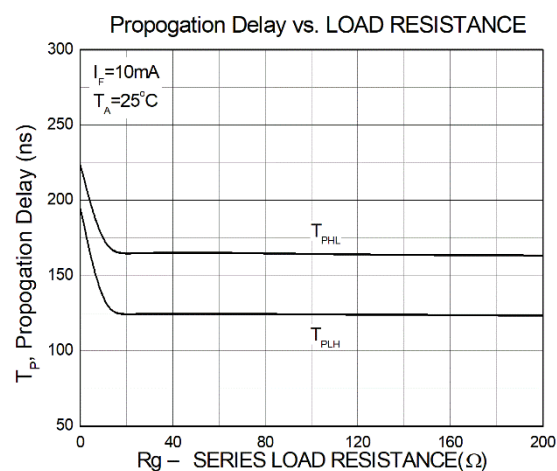


Figure 15

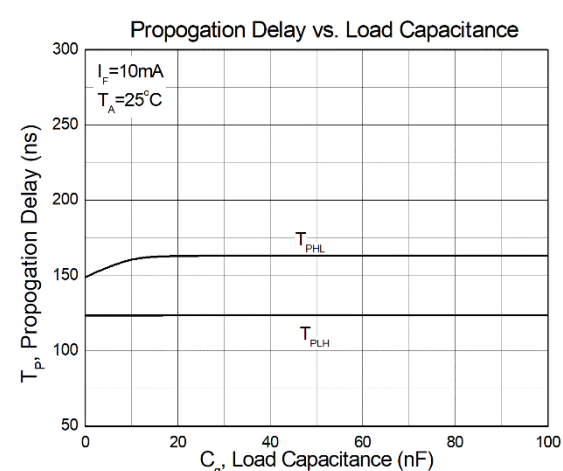


Figure 16

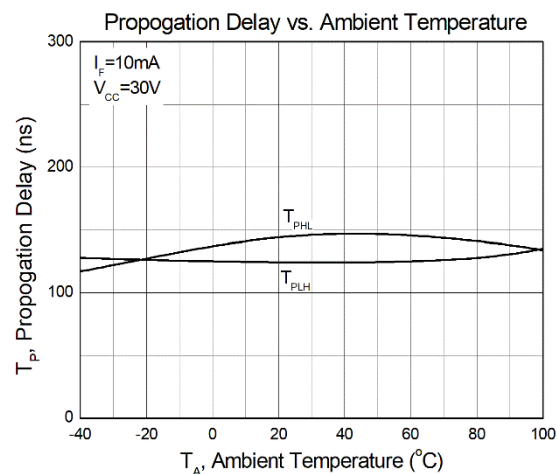
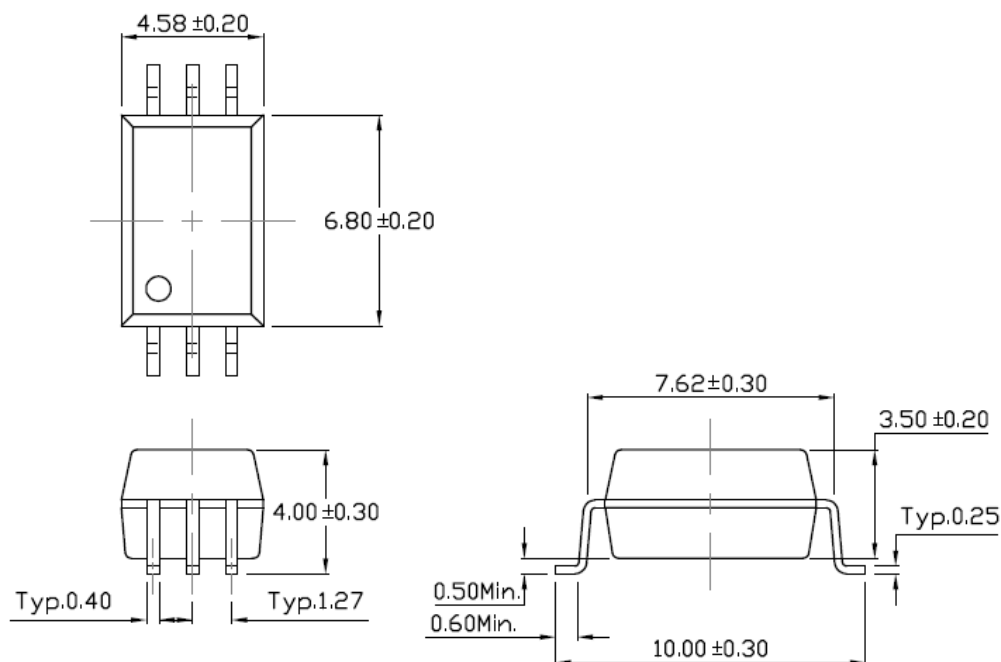


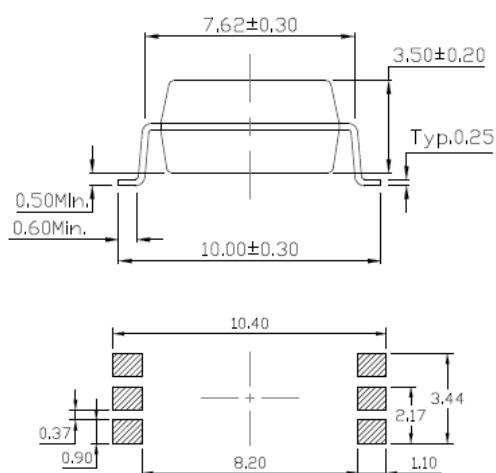
Figure 17



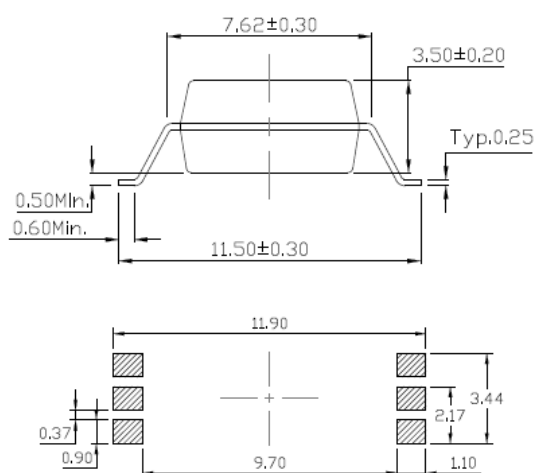
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www.ct-micro.com**Package Dimension** *Dimensions in mm unless otherwise stated***Surface Mount Lead Forming****Forming Option** *Dimensions in mm unless otherwise stated*

S Type



SM Type

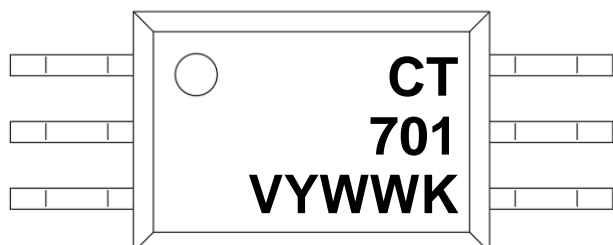




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Marking Information



Note:

CT : Denotes "CT Micro"
701 : Part Number
V : VDE Safety Mark Option (Blank or V)
Y : One Digit Year Code
WW : Two Digit Work Week
K : Manufacturing Code

Ordering Information

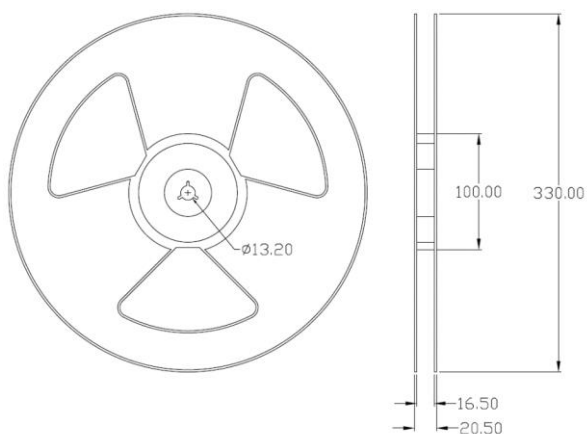
CTS701(V)(Y)(Z)

CT = Denotes "CT Micro"
S701 = Part Number
V = VDE Safety Mark Option (Blank or V)
Y = Lead Form Option (S or SM)
Z = Tape and Reel Option (T1 or T2)

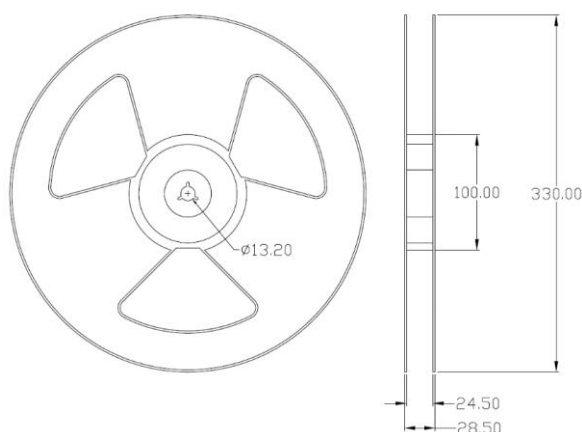
Option	Description	Quantity
T1	Surface Mount Lead Forming with Option 1 Taping	1500 Units/Reel
T2	Surface Mount Lead Forming with Option 2 Taping	1500 Units/Reel
M(T1)	Surface Mount (Gullwing) Lead Forming with Option 1 Taping	1500 Units/Reel
M(T2)	Surface Mount (Gullwing) Lead Forming with Option 2 Taping	1500 Units/Reel

Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option S(T1/T2)



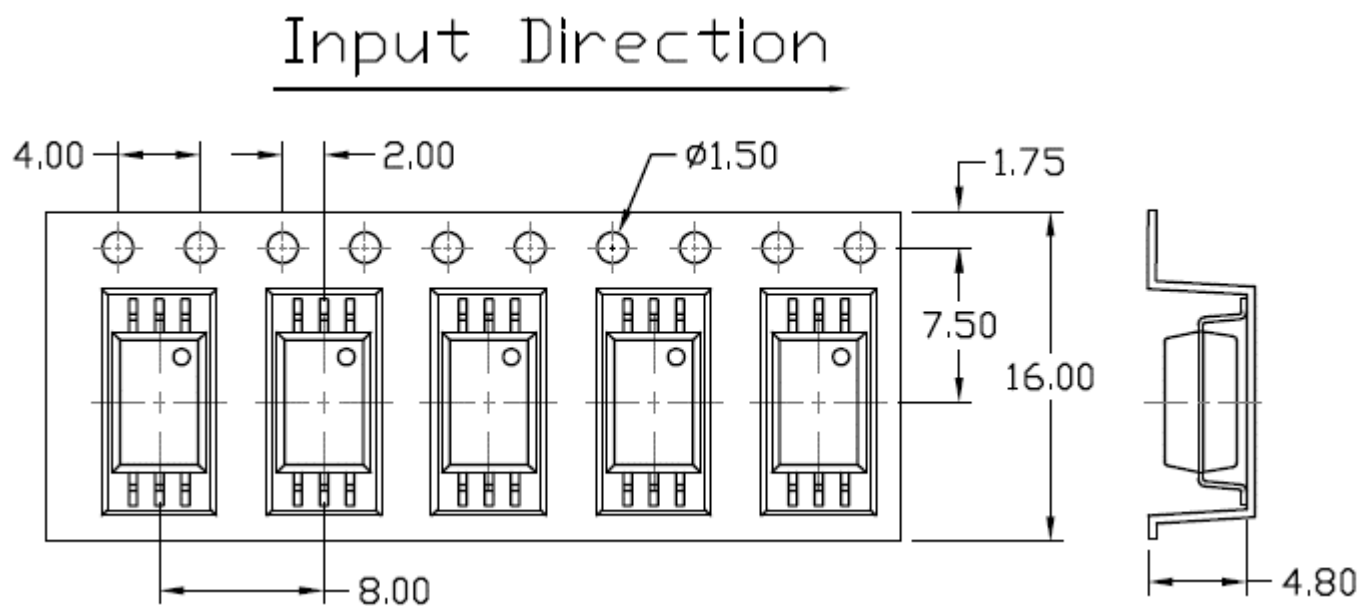
Option M(T1/T2)



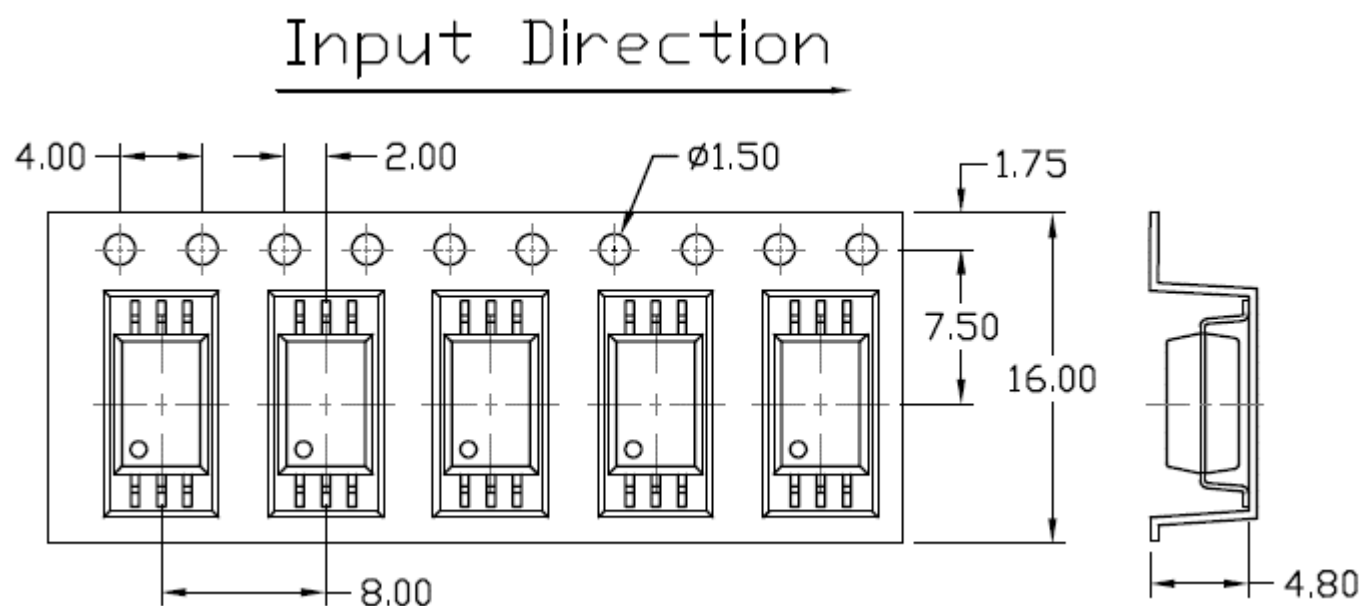


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Option S(T1)



Option S(T2)



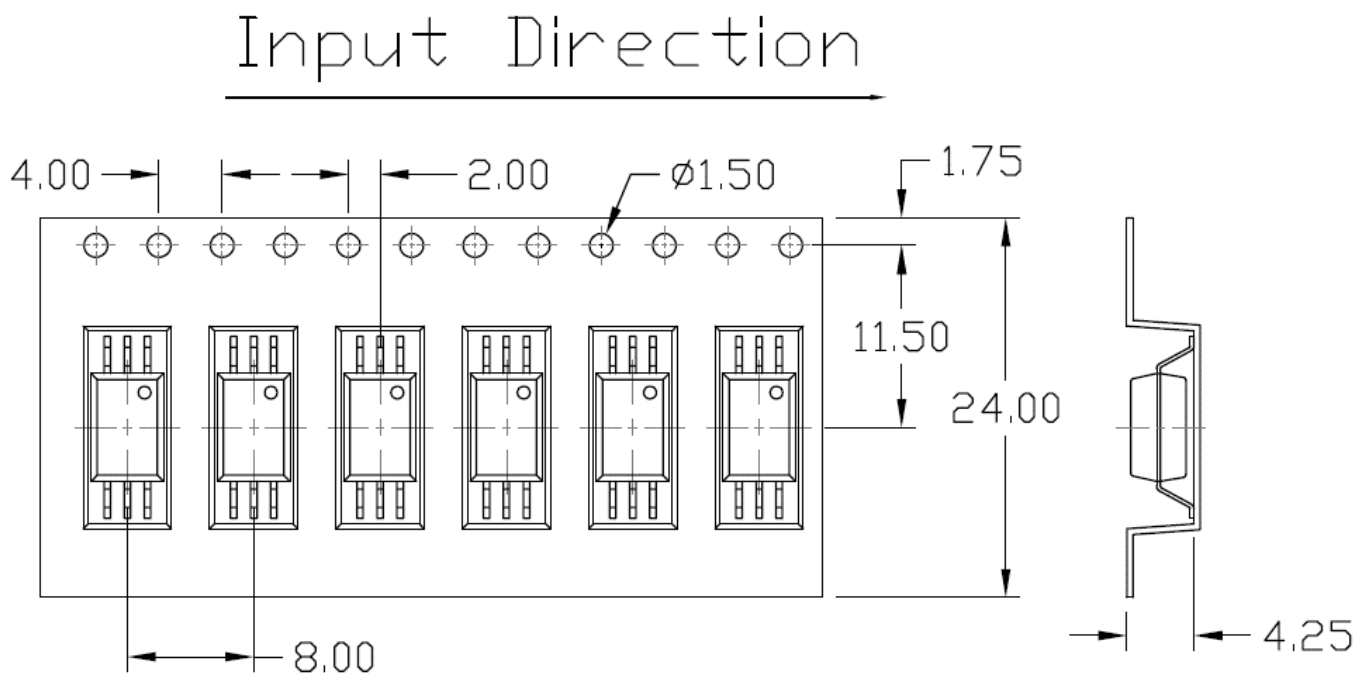


CTS701

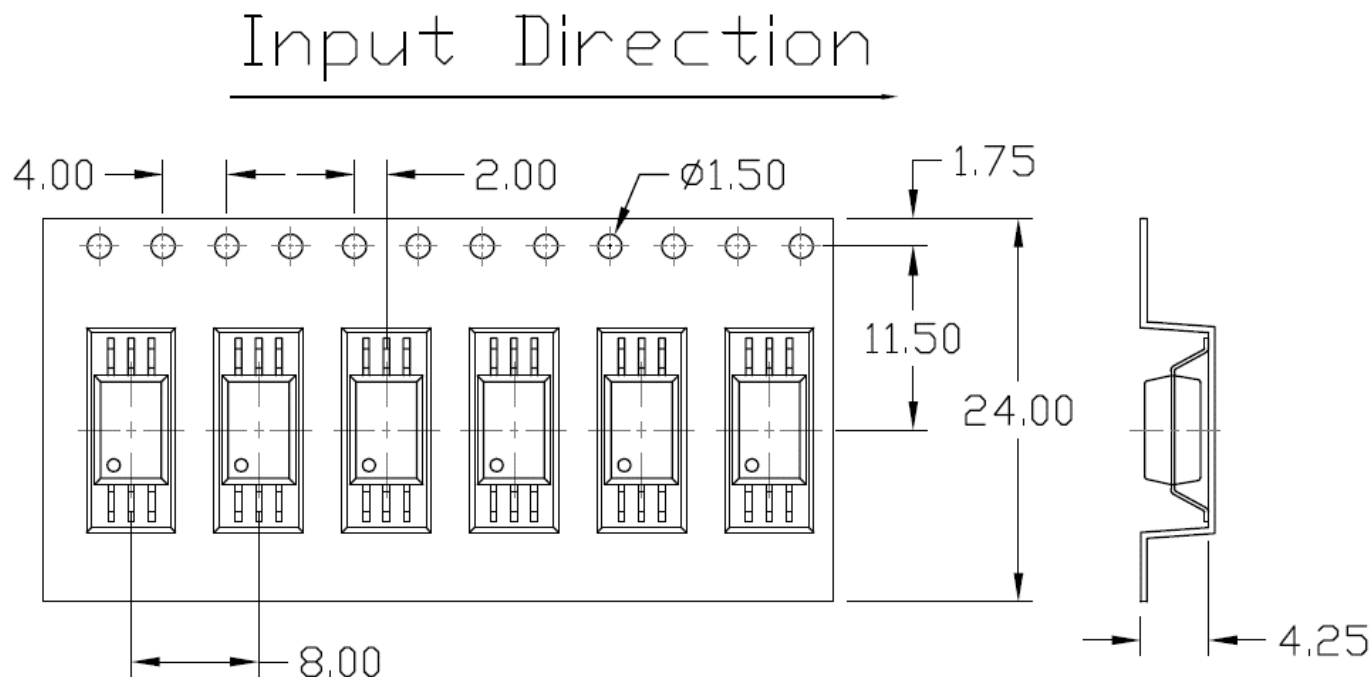
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Option SM(T1)



Option SM(T2)



**Solderability spec (Follow the JEDEC standard JESD22-B102)**

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.

Solder-Bath: More than 95% of the electrode must be covered with solder.

Wave soldering (Follow the JEDEC standard JESD22-A111)

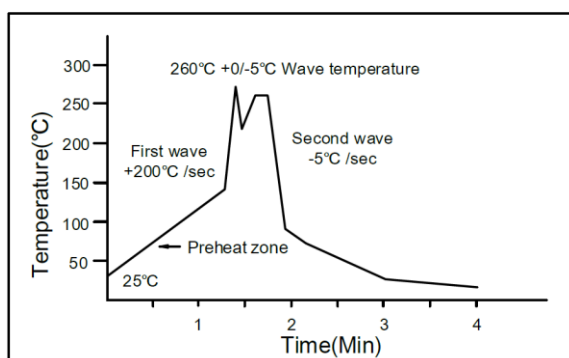
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 0/-5^{\circ}\text{C}$.

Time: 10 sec.

Preheat temperature: 25 to 140°C .

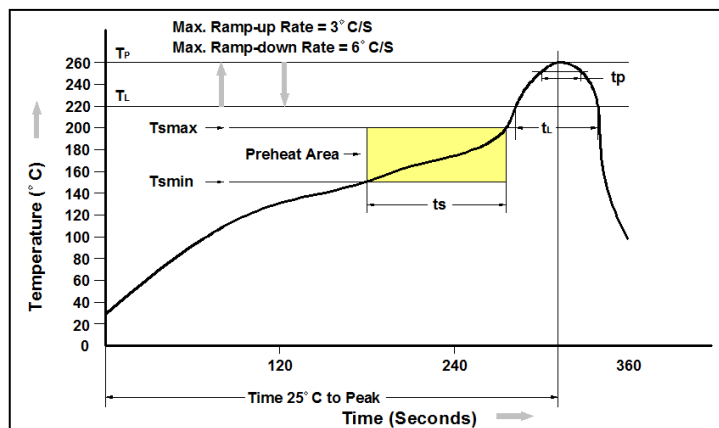
Preheat time: 30 to 80 sec.

**Iron soldering (Follow the standard MIL-STD 202G, Method 210F)**

Allow single lead soldering in every single process.

One time soldering is recommended. Temperature: $350 \pm 10^{\circ}\text{C}$

Time: 5 sec max.

**Reflow Profile (Follow the JEDEC standard J-STD-020)**

Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t _P) within 5°C of 260°C	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

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